Recent progress in experiments and diagnostics for combustion chemistry

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Reliable and predictable chemical kinetic model can help us to understand the combustion process deeply, and potentially help us to design higher-performance engines, increase combustion efficiency and reduce harmful emissions. However, the development of chemical kinetic model is badly relied on the advances of experimental and diagnostic methods. In this talk, basic experimental and diagnostic methods will be introduced. And some recent results will be presented with the upgraded instruments located at Hefei Light Source (HLS) [1,2]. Benefiting from the new design with short distance between the sampling position and the ionization region, a lot of "new" reactive species can be unambiguously detected, i.e., H, O, OH, and hydroperoxides. Furthermore, the techniques can be applied in the detection of gas-phase products of heterogeneous reactions including catalysis reaction, biomass pyrolysis etc. Furthermore we will provide the high-frequency burst-laser based measurements for swirling flame and turbulent jet flame.

References

[1] Z.-Y. Zhou, X.-W. Du, J.-Z. Yang et al., The vacuum ultraviolet beamline/endstations dedicated to combustion research, ***Journal of Synchrotron Radiation*** 23, 1035-1045 (2016).

[2] F. Jiao, J.-J. Li, X.-L. Pan et al., Selective conversion of syngas to light olefins, ***Science*** 351, 1065-1068 (2016).